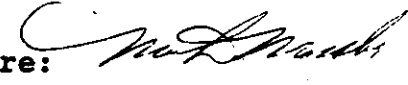
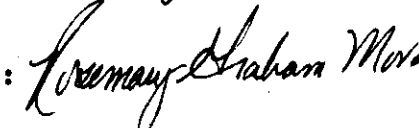
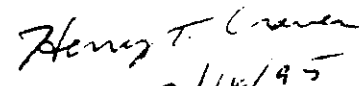


(2/16/95)

MRID No. 428990-03

**DATA EVALUATION RECORD**

1. **CHEMICAL:** Oxine Copper.  
Shaughnessey No. 024002.
2. **TEST MATERIAL:** 1) Quinolinate 98; oxine copper or copper 8-quinolinolate; Batch No. 52390; 100% active ingredient; a green powder. 2)  $^{14}\text{C}$ -oxine copper; Lot No. 029F9233; specific activity of 92.9  $\mu\text{Ci/mg}$ ; 98.25% active ingredient.
3. **STUDY TYPE:** 72-1. Freshwater Fish Acute Flow-Through Toxicity Test. Species Tested: Bluegill Sunfish (*Lepomis macrochirus*).
4. **CITATION:** Ward, G.S. 1993. Oxine Copper (Copper 8-Quinolinolate): Acute Toxicity to Bluegill, *Lepomis macrochirus*, Under Flow-Through Test Conditions. Laboratory Project No. J9006014b. Prepared by Toxikon Environmental Sciences, Jupiter, FL. Submitted by LA QUINOLEINE et ses dérivés, S.A., Paris, France. EPA MRID No. 428990-03.
5. **REVIEWED BY:**  
  
Mark A. Mossler, M.S.  
Associate Scientist  
KBN Engineering and  
Applied Sciences, Inc.  
  
Signature:   
Date: 11/17/93  
  
Joseph Sylvester 4/16/95  
  
Rosemary Graham Mora, M.S.  
Associate Scientist  
KBN Engineering and  
Applied Sciences, Inc.  
  
Signature:   
Date: 11/22/93  
  
Henry T. Craven, M.S.  
Supervisor, EEB/EFED  
USEPA  
  
Signature:   
Date: 2/16/95
7. **CONCLUSIONS:** This study is scientifically sound and meets the guideline requirements for an acute toxicity test using bluegill sunfish. Based on mean measured concentrations, the 96-hour  $\text{LC}_{50}$  of 21.6  $\mu\text{g ai/l}$  classifies oxine copper as very highly toxic to bluegill sunfish. The NOEC was 10.8  $\mu\text{g ai/l}$ .
8. **RECOMMENDATIONS:** N/A.
9. **BACKGROUND:**

10. DISCUSSION OF INDIVIDUAL TESTS: N/A.

11. MATERIALS AND METHODS:

A. Test Animals: Bluegill sunfish (*Lepomis macrochirus*) were obtained from a commercial supplier in Rhinebeck, NY. The fish were maintained in laboratory freshwater for 38 days prior to test initiation. The temperature during the 7-day period prior to test initiation was  $22 \pm 2^\circ\text{C}$ . Commercial feed and newly hatched brine shrimp were fed daily during holding. No mortality was observed in the population during the 48 hours prior to test initiation. Mean wet weight and standard length of the control fish were 0.19 (0.12-0.30) g and 20 (18-23) mm at the end of the study. Biomass loading rate was approximately 0.035 g/l/day.

B. Test System: A proportional diluter with a 60% dilution factor was used to prepare the test solutions. The test chambers were 24-l glass tanks containing 15 l of test solution. The test solution depth was 13 cm. The number of volume additions was approximately 7.2 per day. The test chambers were randomly positioned in a water bath under a 16-hour light photoperiod with a light intensity of 325-442 lux. Fifteen-minute dawn and dusk simulations were employed.

A stock solution containing 0.7% radiolabeled material and 99.3% unlabeled material was prepared in acidified dimethylformamide (DMF). The concentration of oxine copper in the stock solution was 1 mg active ingredient (ai)/ml. The stock was pumped into the chemical mixing chamber with each diluter cycle providing a nominal concentration of 100  $\mu\text{g ai/l}$ . This solution was proportionally diluted to provide the remaining treatment solutions.

The test dilution water was carbon-treated city water (town of Jupiter, FL). The water was vigorously aerated prior to use. The hardness of the dilution water was 72-74 mg/l as  $\text{CaCO}_3$  and the alkalinity was 24-28 mg/l as  $\text{CaCO}_3$ . The specific conductivity was 359  $\mu\text{mhos/cm}$ .

C. Dosage: Ninety-six-hour, flow-through test. Based on preliminary testing, five nominal concentrations (13.3, 22.1, 36.8, 61.3, and 102  $\mu\text{g ai/l}$ ), a solvent control (0.1 ml DMF/l), and a dilution water control were prepared for the definitive test.

- D. **Design:** Twenty bluegill were impartially distributed (by twos) to each aquarium, one aquarium per treatment or control. Observations of mortality and sublethal responses were made every 24 hours and dead fish were removed when found. The fish were not fed during testing and the test solutions were not aerated.

The temperature in the water bath was monitored continuously using a minimum/maximum thermometer and a control tank was monitored hourly using a recording device. The dissolved oxygen concentration (DO) and pH were measured in all test solutions (containing surviving fish) daily. The hardness, alkalinity, and conductivity were measured at test initiation and termination.

Water samples from each aquarium were collected at test initiation and termination for analysis of the test material. Concentrations of the test material were measured using liquid scintillation counting.

- E. **Statistics:** The median lethal concentration ( $LC_{50}$ ) and associated 95% confidence interval (C.I.) for each 24-hour interval were calculated using a computer program which employed several computational methods.

12. **REPORTED RESULTS:** The mean measured concentrations were 10.8, 19.0, 33.7, 55.2, and 95.0  $\mu\text{g ai/l}$  (Table 1, attached) and averaged 81 to 93% of nominal.

There was no mortality or sublethal effects in the control or 10.8  $\mu\text{g ai/l}$  treatment groups (Table 2, attached). The 96-hour  $LC_{50}$ , based on mean measured concentrations, was 21.6  $\mu\text{g ai/l}$  (95% C.I. = 10.8-33.7  $\mu\text{g ai/l}$ ) using the binomial probability method. The no-observed-effect concentration (NOEC) was 10.8  $\mu\text{g ai/l}$ , based on the lack of mortality or sublethal effects.

During the test, the DO ranged from 7.4 to 8.3 mg/l (83 to 93% of saturation) and the pH values ranged from 7.8 to 8.0. The temperature was 20.3-21.3°C.

13. **STUDY AUTHOR'S CONCLUSIONS/QUALITY ASSURANCE MEASURES:**  
No conclusions were made by the author.

Quality Assurance and Good Laboratory Practice (GLP) statements were included in the report, indicating that the study was conducted in accordance with EPA GLP Regulations set forth in FIFRA 40 CFR Part 160.

14. REVIEWER'S DISCUSSION AND INTERPRETATION OF STUDY RESULTS:

- A. Test Procedure: The test procedures were generally in accordance with the SEP, except for the following:

The dilution water was city tap water which was probably chlorinated before being treated in the laboratory. The use of this type water is discouraged. Since no control mortality was observed, the use of this water probably did not affect the results of the study.

- B. Statistical Analysis: The reviewer used EPA's Toxanal program to calculate the 96-hour  $LC_{50}$  value and 95% confidence interval (see attached printout) and obtained the same results.

- C. Discussion/Results: This study is scientifically sound and meets the guideline requirements for an acute toxicity test using bluegill sunfish. Based on mean measured concentrations, the 96-hour  $LC_{50}$  of 21.6  $\mu\text{g ai/l}$  classifies oxine copper as very highly toxic to bluegill sunfish. The NOEC was 10.8  $\mu\text{g ai/l}$ .

- D. Adequacy of the Study:

(1) Classification: Core.

(2) Rationale: N/A.

(3) Repairability: N/A.

15. COMPLETION OF ONE-LINER FOR STUDY: Yes, 11-16-93.

Acute Xme Copper Study mms 428770-03

Page \_\_\_\_\_ is not included in this copy.

Pages 5 through 6 are not included in this copy.

The material not included contains the following type of information:

- \_\_\_\_\_ Identity of product inert ingredients.
- \_\_\_\_\_ Identity of product impurities.
- \_\_\_\_\_ Description of the product manufacturing process.
- \_\_\_\_\_ Description of quality control procedures.
- \_\_\_\_\_ Identity of the source of product ingredients.
- \_\_\_\_\_ Sales or other commercial/financial information.
- \_\_\_\_\_ A draft product label.
- \_\_\_\_\_ The product confidential statement of formula.
- \_\_\_\_\_ Information about a pending registration action.
- ☒ FIFRA registration data.
- \_\_\_\_\_ The document is a duplicate of page(s) \_\_\_\_\_.
- \_\_\_\_\_ The document is not responsive to the request.

The information not included is generally considered confidential by product registrants. If you have any questions, please contact the individual who prepared the response to your request.

MOSSLER OXINE COPPER LEPOMIS MACROCHIRUS 11-16-93

\*\*\*\*\*  
CONC.      NUMBER      NUMBER      PERCENT      BINOMIAL  
            EXPOSED      DEAD      DEAD      PROB. (PERCENT)  
95          20          20          100          9.536742E-05  
55.2        20          20          100          9.536742E-05  
33.7        20          20          100          9.536742E-05  
19          20          6          30          5.765915  
10.8        20          0          0          9.536742E-05

THE BINOMIAL TEST SHOWS THAT 10.8 AND 33.7 CAN BE  
USED AS STATISTICALLY SOUND CONSERVATIVE 95 PERCENT  
CONFIDENCE LIMITS, BECAUSE THE ACTUAL CONFIDENCE LEVEL  
ASSOCIATED WITH THESE LIMITS IS GREATER THAN 95 PERCENT.

AN APPROXIMATE LC50 FOR THIS SET OF DATA IS 21.61039

WHEN THERE ARE LESS THAN TWO CONCENTRATIONS AT WHICH THE  
PERCENT DEAD IS BETWEEN 0 AND 100, NEITHER THE MOVING AVERAGE  
NOR THE PROBIT METHOD CAN GIVE ANY STATISTICALLY SOUND RESULTS.

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